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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/081,872	02/21/2002	Walter Callen	564462006100	9897

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EXAMINER	
PROUTY, REBECCA E	
ART UNIT	PAPER NUMBER
1652	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/081,872	CALLEN ET AL.	
	Examiner	Art Unit	
	Rebecca E. Prouty	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *See Continuation Sheet* is/are pending in the application.

4a) Of the above claim(s) *74,108,112-116,118-121 and 147-166* is/are withdrawn from consideration.

5)☒ Claim(s) *3* is/are allowed.

6)☒ Claim(s) *1, 2, 4, 6, 10-12, 14-17, 47, 48, 75-80, 84-86, 88, 89, 92, 102-107, 122-146, 167-175* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Disposition of Claims: Claims pending in the application are 1-4,6,10-12,14-17,47,48,74-80,84-86,88,89,92,102-108,112-116 and 118-175.

Claims 5, 7-9, 13, 18-46, 49-73, 81-83, 87, 90-91, 93-101, 109-111, and 117 have been canceled. Claims 1-4, 6, 10-12, 14-17, 47, 48, 74-80, 84-86, 88, 89, 92, 102-108, 112-116, 118-166 and newly presented claims 167-175 are still at issue and are present for examination.

Claims 74, 108, 112-116, 118-121 and 147-166 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction requirement in the response filed 6/23/03. Claims 1-4, 6, 10-12, 14-17, 47, 48, 75-80, 84-86, 88, 89, 92, 102-107, 122-146 and newly presented claims 167-175 are examined herein.

Claims 1, 2, 4, 6, 10-12, 14-17, 48, 75-80, 84-86, 88, 89, 92, 102-107, 123-128, 131-146 and 167-175 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 (upon which claims 6, 14-17, 48, 125, 134, and 135 depend), part(b) lacks antecedent basis for the recitation "the amino acid sequence". It is suggested that "wherein the amino acid sequence has" be replaced with "wherein the polypeptide has an amino acid sequence having"

Claim 1 (upon which claims 6, 14-17, 48, 125, 134, and 135 depend), part(c) is indefinite in the recitation "the nucleic acid of (a) or (b) and comprising …" as the language makes it appears that the features which follow the word "comprising" are in addition to the nucleic acid of (a) or (b) not within the nucleic acid of (a) or (b)

Claim 123 is indefinite in the recitation of 99% identity to SEQ ID NO:126 over a region of at least 75 consecutive residues" as a single change within a region of only 75 residues would lead to a % sequence identity of less than 99%.

Claims 10-11 (upon which claims 132, and 138-142 depend) is confusing in the recitation of "encoding a polypeptide having alpha amylase activity consisting of a sequence having at least 98% sequence identity to 150 consecutive amino acid residues of SEQ ID NO:126" in Claim 10 or "encoding a polypeptide having alpha amylase activity consisting of a sequence having at least 99% sequence identity to 100 consecutive amino acid residues of SEQ ID NO:126" as there is no indication that any polypeptide fragment of SEQ ID NO:126 of only 100 or 150 amino acids in length has alpha amylase activity such that there appears to be no such sequences.

Applicants response states that Claims 10 and 11 have been amended. However, the amendments to the claims in no way

clarify what applicants are intending to claim as the amended claims also appear to not encompass any known or disclosed nucleic acid.

Claim 12 (upon which claims 133, and 138-142 depend) is confusing in the recitation "encoding a polypeptide having alpha amylase activity consisting of a sequence having at least 90% sequence identity to about 300 consecutive residues of the nucleic acid sequence of SEQ ID NO:125" as there is no indication that any fragment of SEQ ID NO:125 of only 300 nucleotides in length encodes a peptide having alpha amylase activity such that there appears to be no such sequences.

Applicants response states that Claim 12 has been amended. However, the amendments to the claim in no way clarify what applicants are intending to claim as the amended claim also appears to not encompass any known or disclosed nucleic acid.

Claim 124 is confusing in the recitation of "wherein the nucleic acid sequence identity is determined comprising use of a BLASTN algorithm" as the only sequence identity recited in Claim 47 (from which claim 124 depends is amino acid sequence identity but BLASTN is an algorithm for determining identity of nucleic acid sequences.

Claim 2 (upon which claims 4, 6, 16-17, 75-80, 84-86, 88, 89, 92, 102-107, 125-127, 131, 174 and 175 depend) is confusing

in the recitation of "a nucleic acid sequence encoding a polypeptide having alpha amylase activity, wherein the nucleic acid sequence has at least 90% sequence identity to the sequence of SEQ ID NO:126" as nucleic acids do not comprise amino acid sequences.

Claims 136 and 137 are indefinite and confusing in the recitation "recombinant nucleic acid **comprising** (a) a nucleic acid sequence encoding a polypeptide having alpha amylase activity, wherein the nucleic acid **consists** of a sequence having at least 90% sequence identity to about 400 consecutive residues of SEQ ID NO:125" as the use of both the terms "comprising" and "consists of" makes it unclear if the nucleic acid can have additional sequences present or not. Furthermore, it should be noted that if the term "consists of" was actually intended, the claims are further confusing as there is no indication that any fragment of SEQ ID NO:125 of only 400 or 500 nucleotides in length encodes a polypeptide having alpha amylase activity such that the claim would appear to encompass no sequences.

Claims 167-173 are vague and indefinite in the recitation "at least about" as "at least" and "about" are inconsistent as "at least" requires a definite lower limit, while "about" does not.

Claims 10-12, 17, 75-80, 84-86, 88, 89, 92, 128, 129, 132-133, 136-142 and 167-175 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The rejection is explained in the previous Office Action.

Applicants responded to the examiners previous statement that the application teaches **NO** representative species of any sequences within the scope of claims 10-12, 132, 133, and 136-142 as the specification does not teach any portion of the protein of SEQ ID NO:126 of 100-150 amino acids in length that has alpha amylase activity by arguing that a description of the exact subsequence size and function of a biological sequence based on an exemplary sequence is sufficient to satisfy section 112, because an adequate written description of the invention may be shown by any description of sufficient, relevant, identifying characteristics so long as a person skilled in the art would recognize that the inventor had possession of the claimed invention. However, this is completely unclear as merely reciting the desired size and function of a sequence without actually teaching at least one representative species

clearly does not put a person of skill in possession of a such a sequence. Merely wishing for a sequence with particular properties does not mean one exists and the specification provides no indication that such sequences do in fact exist and if they do, what their structures would be.

Applicants argue in response to the rejection of claims 17, 75-80, 84-86, 88, 89, 92, 128, 129, 167 and 174-175 that it is sufficient that a linking functional limitation for members of a genus work for its intended purposes to satisfy the written description requirement, particularly when a composition is being used as a research tool. However, claims 17, 75-80, 84-86, 88, 89, 92, 128, 129, 167, and 174-175 have no recited functional limitation at all. As has been previously stated "hybridizes to SEQ ID NO:125" is not a functional limitation as hybridization is a purely structural phenomenon; i.e., hybridization occurs between any two nucleic acids which are sufficiently similar to each other to bind under the conditions of the hybridization reaction. Even single changes to a nucleic acid sequence can result in the loss of activity of the encoded protein and conversely very different sequences structurally can encode proteins having the same activity. As such the recitation in the instant claims is purely structural in nature

and the claims recite a genus of nucleic acids which are highly diverse in functional features.

The remaining rejected claims, i.e., claims 168-173, do have a both a structural and functional limitation as found in Example 14 of the written description guidelines. However, these claims lack sufficient structural limitations to adequately describe the genus. The requirements for written description of a genus of nucleic acids as set forth in University of California v. Eli Lilly & Co., 43 USPQ2d 1398 (Fed. Cir. 1997) may be achieved by a recitation of a representative number of DNAs defined by nucleotide sequence or a recitation of structural features common to members of the genus, which features **constitute a substantial potion of the genus**. Claims 168-173 all recite nucleic acids which comprise only 300-500 residues having 95% identity to a portion of SEQ ID NO:125 (Claims 168-170), or encoding only 100 residues having 95% identity to a portion of SEQ ID NO:126 (Claims 171-173) as the only recited structural limitations of the claims. These recited structural features of the genus do not constitute a substantial potion of the genus as the remainder of the structure of a nucleic acid encoding a polypeptide with alpha amylase activity is completely undefined. Fragments consisting of only 300-500 residues having 95% identity to a portion of SEQ

ID NO:125 or encoding only 100 residues having 95% identity to a portion of SEQ ID NO:126 are highly unlikely to have alpha amylase activity, constitute only a very small portion of the structure of the only disclosed species (SEQ ID NO:125) and the specification does not define the remaining structural features necessary for members of the genus to be selected.

Claims 1, 6, 10-12, 16, 17, 47, 48, 75-80, 84-86, 88, 89, 92, 122-130, 132, 133, 136-142 and 167-175 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for polynucleotides encoding SEQ ID NO:126, does not reasonably provide enablement for any polynucleotide having at least 90% sequence identity to SEQ ID NO:125 and encoding a polypeptide with an alpha amylase activity or any polynucleotide comprising at least 50-500 bases of a sequence having 90-99% identity to SEQ ID NO:125, or any polynucleotide comprising a fragment of SEQ ID NO:125, or all fragments and variants thereof or vectors and host cells comprising said nucleic acids. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. The rejection is explained in the previous Office Action.

Applicants refer to their previous arguments in response to this rejection and state that they have further amended the claims to be limited to nucleic acids having 90% identity to the sequences of the invention. However, many claims are not limited to nucleic acids having 90% identity to SEQ ID NO:125 in its entirety. Furthermore, even for those claims that are so limited, the amount of experimentation which would be required to enable the full scope of the instant claims is still undue. Applying the estimation method based on Guo et al. discussed in the Final Rejection of 7/1/05, to the instant claims, 90% identity at the nucleic acid level allows up to 139 mutations within the 1395 nucleotides of SEQ ID NO:125 and therefore could result in up to 139 mutations within the 464 amino acids of SEQ ID NO:126 (assuming every alteration in nucleotide sequence resulted in an amino acid change) and even if one assumes that only 50% of nucleotide changes lead to an amino acid change allows up to 70 mutations within the 464 amino acids of SEQ ID NO:126. Applying the estimate produced from the data of Guo et al. to this situation, only $(.66)^{70}$ X 100% or 2.3×10^{-11}% of random mutants having 90% identity to SEQ ID NO:125 would encode active proteins. Current techniques (i.e., high throughput mutagenesis and screening techniques) in the art would allow likely for finding a few active mutants within several hundred

thousand (despite even this being an enormous quantity of experimentation that would take a very long time to accomplish) but finding a few mutants within several billion or more as in the instant claims would not be possible. While enablement is not precluded by the necessity for routine screening, if a large amount of screening is required, the specification must provide a reasonable amount of guidance with respect to the direction in which the experimentation should proceed. Such guidance has **not** been provided in the instant specification.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 75, 76, 84-85, and 92 are rejected under 35 U.S.C. 102(b) as being anticipated by Tachibana et al. (Reference AQ of applicant's IDS).

Tachibana et al. teach the isolation and expression of a polynucleotide encoding *Pyrococcus* sp. KOD1 alpha amylase. This polynucleotide has 80% identity to SEQ ID NO:125 and encodes a protein with 85% identity to SEQ ID NO:126. Furthermore, while the entire gene of Tachibana et al. does not have 90% identity to the entire sequence of SEQ ID NO:125, it comprises a region

of 75 nucleotides having greater than 90% identity to the corresponding portion of SEQ ID NO:125 (i.e., residues 1463-1537 of Tachibana et al. have 93% identity to residues 1018-1092 of SEQ ID NO:125) and thus anticipate claims 75, 76, 84-85, and 92.

Applicants argue that the rejection is overcome by the amendment of Claim 2 to recite nucleic acids having at least 90% identity to SEQ ID NO:125. However, this is not a requirement of the instant claims. The instant claims recite nucleic acids comprising a sequence of at least 75 nucleotides of a nucleic acid of claim 2 (i.e., encoding an alpha amylase and having 90% identity to SEQ ID NO:125). Tachibana et al. clearly do recite a nucleic acid comprising 75 nucleotides of a nucleic acid of claim 2.

Claims 88 and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tachibana et al. (Reference AQ). The rejection is explained in the previous Office Action.

Applicant has not presented any arguments specifically traversing this rejection but instead relies upon the traversal discussed above. Therefore, this rejection is maintained for the reasons presented above.

Claim 3 is allowed.

Claims 2, 4, 14, 15, 102-107, 134, 135, and 143-146 would be allowable if rewritten or amended to overcome the

rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rebecca E. Prouty whose telephone number is 571-272-0937. The examiner can normally be reached on Tuesday-Friday from 8 AM to 5 PM. The examiner can also be reached on alternate Mondays

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapura

Achutamurthy, can be reached at (571) 272-0928. The fax phone number for this Group is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rebecca Prouty
Primary Examiner
Art Unit 1652